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Describes an experiment conducted at the University of Iowa, contrasting the teaching of a core course in modern literature through three teaching methods—discussion, lecture-discussion, and television-discussion. Three criteria were used in the comparison of the three groups: Student opinions of the course and the methods of instruction, faculty opinions of the comparative merits of the methods, and a comparison of final examination grades of a sample of students taught by each method.

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A Comparison of Three Methods of Teaching

MODERN LITERATURE

The State University of Iowa

Iowa City, Iowa

June, 1957

U. S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
Office of Education

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Samuel L. Becker
Director of Television

Rhodes Dunlap
Prof. of English
Course Chairman of Literature
Core Courses

John C. Gerber
Prof. of English

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the Fund for the Advancement of
Education

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One of the three core courses (students are required to take two of the three) in literature at the State University of Iowa is a four semester hour course in Modern Literature. Since its inception in 1946, this course has been taught primarily by the discussion method in sections of 25 to 30 students. During the first semester of the 1956-1957 academic year, this method was compared to two other methods of teaching this course. The three methods were as follows:

a) Predominantly discussion with sections of approximately thirty students meeting four days a week under a single instructor. There were 12 discussion sections in the study.

b) Lecture-discussion with sections of approximately 150 students meeting two days a week for lectures and two days a week for discussion. On the latter days, the large groups were sub-divided into sections of approximately 20 students each. For most of the sub-sections the discussion leader was not the lecturer. There were two lecture-discussion sections in the study.

c) Television-discussion with seventy-three students meeting two days a week for television mediated discussion and two days a week for a lecture in a regular classroom. On the former days, the students were divided into three groups, eight or ten along with the instructor in the television studio with the remainder distributed between two viewing rooms where they could see and hear the instructor and discussants in the studio and could enter the discussion by means of overhead microphones. (See An Experiment in Teaching, The State University of Iowa, Iowa City, Iowa, August, 1956, for details of the physical arrangement.) All that a student in one of the viewing rooms needed to do to enter the discussion was to raise his hand.

The proctor in that room depressed a switch which lit a light on the instructor's desk. When the instructor was ready for the comment or question he asked for it and the proctor pushed the switch in the other direction which activated the overhead microphones and the student could speak without leaving his seat. Students were rotated so that both were in the studio for some time during the semester. There was one television discussion section in the study.

Hereafter, these groups will be referred to as the Discussion group, the Lecture group, and the Television group.

Three criterion measures were used in the comparison of the three groups: student opinions of the course and the methods of instruction, faculty opinions of the comparative merits of the methods, and a comparison of final examination grades of a sample of students taught by each method.

Summary of Results

In general, the Television group was least favorable to the course, the Discussion group was most favorable. In spite of this generally unfavorable attitude, the students who had received part of their instruction via television tended to be more favorable to the use of the television medium for instructional purposes than were either of the other two groups. The Discussion group perceived this course as requiring the most preparation; the Television group perceived it as requiring least. Perceived thought stimulation and learning followed this same pattern; Discussion students felt that they were stimulated to greater thought while the Television students felt they were stimulated to the least thought. Discussion students felt that they learned more and were best able to read competently the various literary forms and to discuss the important aspects

of each. The Television students felt least able in these respects. The Television students felt most frustrated in their desires to participate orally in the class, the Discussion students felt the least frustration of this sort.

Most students indicated a preference for a combination of lectures and discussion for this course, but preferred discussion only to lecture only. The faculty were more evenly divided between a preference for discussion and a combination of lectures and discussion. They were also more negative to a "lecture only" course than the students were.

The instructor of the Television group and his two graduate assistants, who acted as proctors, felt that closed circuit television was better suited for the lecture than for the discussion part of the course. They also felt that it would be worth experimenting with the telecasting of a panel of instructors or an instructor with a panel of selected students.

A comparison of a sample of final examination grades from each of the groups showed the highest mean score for the Lecture group and the lowest for the Television group. These differences were not statistically significant.

Results

Near the end of the semester, each student was requested to complete a questionnaire concerning his attitudes toward the course and the methods of instruction. These questionnaires were completed by 548 students. 288 were in the Discussion group, 211 in the Lecture group, and 49 in the Television group.

Approximately 30% of these students previously had taken one of the other one-semester required courses in Literature. These students were

asked "How would you compare the way this course was taught to the way in which the other was taught?" As Table I shows, the majority of the Discussion group felt that one was as good as the other. This is reasonable since both, presumably, had been taught by the same method. The Lecture group was almost evenly distributed between the three choices, while the Television group definitely preferred the method of their previous course (discussion).

Table I

TV	Lect.	Disc.	% of yeses	
27.8	36.2	40.0		a. This course was taught by a better method.
61.1	31.9	7.5		b. The other course was taught by a better method.
11.1	31.9	52.5		c. One method was as good as the other.

A chi-square analysis of the frequency data was significant at the 5% level of confidence, indicating that the differences between the responses of the three groups was greater than could be attributed to chance since differences this great would occur by chance less than 5 per cent of the time if there were no true differences between groups. ($\chi^2 = 26.83, df = 4$)

Subjects were asked "If you were to take another literature course next semester, which of the following plans would you prefer?" (List A, B, and C in order of preference, and then number your preferences for particular methods under each of these plans.) Each response was weighted with a last choice receiving 0 weight, next to the last choice receiving a weight of 1, etc. Percentages of these weighted totals were then calculated. The resulting data are shown in Table II.

It was clear that the majority of students preferred a combination of lectures and discussion. This preference was strongest within the Lecture group and weakest within the Discussion group. It appeared to make little difference within any of the groups whether the lecture part of the combination class was done in a large classroom or small.

Table II

TV	Lect.	Disc.	
38.1	24.0	42.6	A. Informal discussion, with few or no formal lectures.
44.7	55.4	56.5	a. In sections of about thirty taught in a regular classroom.
15.4	10.9	10.2	b. In sections of about thirty taught by closed-circuit television and a sound system which enables students viewing television sets to enter the discussion.
39.9	33.7	33.3	c. In sections of about thirty meeting half the time in a regular classroom and half the time with the arrangement described under "b".
8.85	15.9	9.0	B. Lectures, with little or no discussion.
48.9	81.0	67.0	a. In a large classroom with the lecturer.
51.1	19.0	33.0	b. In classrooms by television.
53.05	60.1	48.4	C. Combination of lectures and discussion.
28.05	39.0	32.6	a. Lectures in a large classroom two days a week and discussions in sections of about twenty the other two days.
28.05	31.2	36.5	b. In sections of about thirty taught in a regular classroom for both lectures and discussions.
15.1	12.1	11.7	c. In a large classroom with lecturer two days a week, and the other two days in sections, of about thirty taught by closed-circuit television and a sound system which enables students viewing television sets to enter the discussion.
28.8	17.7	19.5	d. In sections with about thirty meeting two days a week in a regular classroom for the discussion, the other two days viewing the lecturer on television.

It would appear that those who have had experience being taught via television are more favorably disposed toward this method than those who have not experienced it. On each of the five choices involving television, the respondents in the Television group were more favorable than either the Lecture or the Discussion group. In only one of these cases, however, did the majority of the Television group favor television over the regular classroom. This was on the question of whether to view a lecturer in a classroom or via television. Even here, the majority was only slight.

As shown in Tables III and IV, the Discussion group felt that this course necessitated the most preparation while the Television group felt it necessitated least. These differences were statistically significant.

($\chi^2 = 22.42$ and 33.03 . d.f. = 4)

Table III

TV	Lect.	Disc.	3. How does this course compare with other <u>discussion</u> courses you have taken in the amount of preparation required?
16.3	19.9	28.8	a. More for this course.
51.0	60.7	60.1	b. About the same.
32.7	19.0	10.8	c. Less for this course.
	.47	.35	N.R.

Table IV

TV	Lect.	Disc.	4. How does this course compare with other <u>lecture</u> courses you have taken in the amount of preparation required?
14.3	18.0	26.0	a. More for this course.
53.0	58.3	53.2	b. About the same.
32.7	23.7	18.7	c. Less for this course.
		2.1	N.R.

Although the Discussion group felt this course necessitated more preparation than did the Lecture group, there were only minor differences between the comparison to other discussion courses and to other lecture courses. As a matter of fact, these results would seem to indicate that these students felt that they had to do slightly more preparation in other lecture courses than in other discussion courses. Though these differences are slight, they are consistent for each of the three groups.

As Tables V and VI show, students in the Discussion group felt that they learned more in this course than in other lecture or discussion courses. Students in the Lecture group felt that they learned about the same amount, though this course had a slight edge. Students in the Television group felt they learned less. Chi-squares for the responses to both questions were significant at the 5% level of confidence. ($\chi^2 = 48.60$ and 29.51 . d.f. = 4)

Table V

TV	Lect.	Disc.	5. Compared to similar <u>discussion</u> courses that you have taken, do you feel that in this course you learn:
20.4	33.7	53.2	a. More.
32.7	34.6	33.7	b. About the same.
46.9	31.3	12.8	c. Less.
	.47	.35	N.R.

Table VI

TV	Lect.	Disc.	6. Compared to similar <u>lecture</u> courses that you have taken, do you feel that in this course you learn:
10.2	36.0	39.6	a. More.
35.8	40.3	39.9	b. About the same.
51.0	23.7	18.1	c. Less.
		2.4	N.R.

When Tables V and VI are compared, it appears that students felt that they learned more in the usual lecture course than they did in the usual discussion course. This shows up quite clearly in the responses of the Discussion and the Television group where it can be seen that these students felt that the present course compared more favorably to other discussion courses than to other lecture courses. There was a slight reversal in the Lecture group responses. The latter group felt that this course was about equal to similar discussion courses on the learning criterion but somewhat superior to similar lecture courses.

When these students were asked to compare their present course to similar courses with respect to thought stimulation, all groups were more favorable to their present course than they were on the questions concerning learning. Again, the Discussion group was most favorable and the Television group the least. Also, the present course compared more favorably to other discussion courses than to other lecture courses. These results are seen in Tables VII and VIII.

Table VII

TV	Lect.	Disc.	7. Compared to similar <u>discussion</u> courses that you are taking, do you feel that in this course you are stimulated to:
38.8	46.0	67.0	a. Greater thought.
35.7	37.9	27.1	b. About the same.
24.5	16.1	5.9	c. Less thought.

Table VIII

TV	Lect.	Disc.	8. Compared to similar <u>lecture</u> courses that you are taking, do you feel that in this course you are stimulated to:
20.4	39.8	51.4	a. Greater thought.
44.9	36.5	33.7	b. About the same.
34.7	23.7	12.1	c. Less thought.
		2.8	N.R.

Chi-square tests showed the differences between these groups on each question were significant at the 5% level of confidence. ($\chi^2 = 36.22$ and 20.02 . d.f. = 4)

The question of whether students were ever frustrated in their attempts at class participation was investigated. The results are shown in Table IX.

Table IX

TV	Lect.	Disc.	9. Were there any times when you wanted to ask questions or say something in this course this semester and were not able to do so?
6.1	4.7	3.5	a. Many times.
40.8	28.4	15.6	b. Sometimes.
20.4	35.6	33.3	c. Seldom.
32.7	29.9	47.6	d. Never.
	1.4		N.R.

The differences between groups on this question are significant at the 5% level of confidence. ($\chi^2 = 29.89$. d.f. = 5) Students in the Television group felt most frustrated, students in the Discussion group felt least frustrated. This, of course, does not necessarily indicate that students in one group were able to participate more than students in another group; however, this would certainly be a reasonable hypothesis.

When the students were asked the reasons for their responses to this last question, it appeared that insufficient time or size of class appeared to be the greatest single reason for the frustration of a desire to participate. This was indicated by over 8% of students in the Discussion and the Television groups and over 12% of those in the Lecture group. Related to the matter of time was the comment by almost 4% of the students in the Lecture group and over 12% in the Television group that the lecturers delivered material so rapidly that questions were impossible. A similar criticism, voiced by approximately 2% of the students in each of the groups was that the discussion leaders lectured too much.

A number of students also indicated that the instructors discouraged individual thinking. They stated that the instructor was very unsympathetic to thoughts that differed from his. A response of this sort was received from 1½% of those in the Discussion group, 2% in the Television group, and over 4% in the Lecture group, though most of the latter indicated that their criticism related to the days when they met in small discussion sections.

Over 3% of the Discussion group and 4% of the Lecture group hesitated to participate because they felt they had too little knowledge about literature. Over 7% of the Discussion group also indicated a fear of their ability to express their thoughts.

Approximately 2% of the Discussion and Lecture groups and 10% of the Television group indicated that the reason they were sometimes thwarted in a desire to participate was that certain students were allowed to monopolize all of the class time.

A few students in each group also indicated that the discussion leaders did not keep the discussion on pertinent topics or that their own questions were not important enough to take up class time. Over $\frac{1}{2}$ of the students in the Lecture group stated that they felt that individual responses would disrupt the train of thought of the class during the lecture.

Over 16% of the Television group indicated that they did not speak as often as they wanted to because the process was so complicated when they were in the viewing rooms -- i.e., raising one's hand, getting the proctor's attention, having him signal the instructor, etc.

Among those who responded that they were able to speak whenever they wanted to, most simply gave as the reason the fact that there was ample time and opportunity for participation. This was stated by almost 31% of the Discussion group, 8% of the Lecture group, and 4% of the Television group. $3\frac{1}{2}\%$ of the Discussion group and $10\frac{1}{2}\%$ of the Lecture group said they felt no need to ask questions because they were generally answered sometime during the class periods. $4\frac{1}{2}\%$ of the Discussion group indicated that the sections were small and informal enough for one to comfortably ask questions. $1\frac{1}{2}\%$ of the Lecture group said that this was true on those days that they met for discussion.

As a result of this course, the Television group did not feel as well prepared to observe and discuss important elements of literature as did the Lecture and Discussion groups. The Discussion group perceived itself as being best prepared to observe and discuss each element except symbols. On this element, the Lecture group appeared slightly more confident. These results can be seen in Table X.

Table X

10. As a result of this course how well do you think you are now prepared to observe while reading a literary work and to discuss after reading it each of the following:

	Well Prepared			Adequately prepared			Poorly prepared			Not prepared at all			N.R.		
	TV	Lec.	Disc.	TV	Lec.	Disc.	TV	Lec.	Disc.	TV	Lec.	Disc.	TV	Lec.	Disc.
1. Point of view	8.2	30.4	25.3	67.3	61.2	69.1	24.5	7.6	5.6	0.0	4.7	0		.47	
2. Organization	12.2	12.3	12.5	55.2	67.4	68.8	30.6	17.5	16.3	2.0	1.4	1.0		1.4	1.4
3. Use of symbols	16.3	22.3	20.1	34.7	54.5	54.9	36.7	19.4	24.0	10.2	2.4	1.0	2.0	1.4	
4. Meaning	14.3	15.2	22.2	51.0	59.3	61.2	32.7	23.2	15.6	2.0	1.9	.35		.47	.7
5. Language	12.2	10.0	16.7	59.3	63.6	66.0	24.5	23.7	16.3	4.0	1.4	.35		1.4	.7
6. Tone	16.3	13.3	14.2	53.1	59.3	69.4	20.4	23.2	15.0	8.2	3.8	1.0	2.0	.47	.35
7. Overall effectiveness	8.2	13.7	20.1	67.3	66.4	70.2	24.5	15.6	9.0	0.0	2.4	0.0		1.9	.

Chi-square analyses of these data, performed separately for each of the seven elements, were significant at the pre-set 5% level of significance except for section 2, organization. ($\chi^2 = 27.04, 6.96, 14.13, 12.80, 10.03, 11.53, \text{ and } 16.95. \text{ d.f.} = 4$)

The Discussion students felt most confident about their ability to read various forms of literature following this course while the Television students felt least confident. These results can be seen in Table XI.

Table XI

11. In this course we have read short stories, a novel, plays, and poetry. Indicate how useful the instruction in the course has been in your opinion in helping you to become a more competent and a more interested reader.

	Very Useful			Useful			Slightly Useful			Not at all Useful			N.R.		
	TV	Lec.	Disc.	TV	Lec.	Disc.	TV	Lec.	Disc.	TV	Lec.	Disc.	TV	Lec.	Disc.
1. Short stories	44.9	50.3	59.7	40.8	39.4	34.7	12.2	9.5	5.6	2.0	.9	0.0			
2. Novels	28.6	36.0	45.2	36.7	44.6	42.3	28.6	16.6	10.4	6.1	1.9	2.1		.9	
3. Plays	18.4	37.5	41.3	40.8	43.1	46.2	30.6	14.7	10.4	10.2	4.3	2.1		.47	
4. Poetry	18.4	23.2	36.1	30.6	28.9	30.9	24.5	31.8	26.4	26.5	15.2	6.6		.9	

Chi-square analyses of these data, performed separately for each of the four literary forms, indicated that the groups differed significantly on

their distributions of responses on all but the first form, short stories. (χ^2 's were 9.81, 17.66, 26.59, and 28.56 in that order; d.f. = 4 for 11.1 and 11.2 and 5 for 11.3 and 11.4. The reasons for the lower degrees of freedom for the first two was because the "slightly useful" and the "not at all useful" responses were grouped in these analyses because of the low number of responses in each cell.)

It is interesting to see that all groups agreed that their instruction was most helpful in preparing them to read short stories and then novels. They felt it prepared them least well to read poetry.

Table XII indicates how much students in each group felt they were motivated to continue their reading in the area of this course.

Table XII

TV	Lect.	Disc.	12. Do you think that you will continue reading selections in modern literature next year when you are no longer taking a course in this area?
18.4	20.4	19.4	a. Will probably read a great deal.
42.9	54.1	59.4	b. Will probably read some.
25.5	19.4	18.8	c. Will probably read little.
10.2	6.2	2.4	d. Will probably read none.
2.0		N.R.	

The Television group appeared to feel least motivated. Differences between the other two groups were negligible. These differences between groups were significant at the 5% level of confidence. ($\chi^2 = 11.11$. d.f. = 5)

Table XIII includes the data on a similar question. The differences between groups were not significant on this question. ($\chi^2 = 7.51$. d.f. = 4)

Table XIII

TV	Lect.	Disc.	13. Has this course made you want to take more courses in literature than you had previously planned to take?
6.1	5.2	4.5	a. Yes, even if I have to change my schedule to do so.
26.5	34.6	43.4	b. Yes, if my schedule will allow more courses in literature.
67.4	58.8	50.7	c. No.
	1.4	1.4	N.R.

At the end of the questionnaires, students were asked to note any further reactions, suggestions, or comments which they had about the course which were not included in the questions. Most of the comments received had little to do with the overall method of instruction -- discussion vs. lecture vs. television. There were a few exceptions. Some students felt there needed to be more lecture and less discussion. This point of view was expressed by over 12% of the Television group, almost 3% of the Lecture group and 1.5% of the Discussion group. A few students, on the other hand, took the opposite point of view. 8% of the Lecture group thought that the course should be taught entirely by the discussion method. 2% (1 student) in the Television group thought that there should be more student discussion. Over 3% of the students in the Discussion group noted that it depends upon the instructor whether or not discussion is valuable.

There were some comments of the Television students relating specifically to that group. 6% noted a lack of "student-teacher contact." 10% said they preferred small discussion groups to television. 6% thought television a good plan but said it would work better after instructors and students had had more experience in it. 4% felt that the television sessions dragged because of the difficulty of following the instructor's thoughts and the difficulty of communicating with the various groups. Other comments, each made by only a single student, were that one of the proctors talked

too much during television sessions, that a separate class discussion was needed just on the material covered during the television session, and that the only value of television is for the person who cannot leave home. Two students indicated a dislike for one of the proctors. Two others stated that they liked being in the studio because it gave them an opportunity to say something at least once during the semester.

There were also some comments by some of the Lecture students which related specifically to that method. Almost 4% of the group thought that the discussion leaders should attend all lectures in order to keep the discussion sequences in the same order as the lectures. Some noted that at times the lecturer and discussion leader were not in agreement. 1.5% felt that combining lectures and discussion was bewildering. Another noted that this system was good because more ideas were interjected by different instructors. 2% felt that it was better to have the same instructor for the lecture and the discussion. Related to this was a problem felt by a number of students in each of the groups. This was the fact that grading and requirements were not consistent with all instructors. Some were concerned with this as a problem within the group -- e.g., the television instructor and his two proctors or the large class lecturer and the discussion leaders -- while others were concerned with it as a problem between groups -- the consistency of grading from section to section. This bothered 10% of the students in the Television group and 2% in the Discussion and Lecture groups.

Many of the remaining comments related to the content or other aspects of the course and had little or nothing to do with the instructional methods being studied. 4% of the Television group, .5% of the Lecture group, and 2.5% of the Discussion group thought that the course was taught on too high a level. A few thought that the course covered too much material. Almost

4% of the Discussion students felt that poetry was poorly handled in the course and was a waste of time. Almost 5% of the Lecture group did not like the way poetry was handled but they felt this was because it was not given sufficient attention. A few students thought that Literature should not be a required course, but an equal number felt that there should be a two semester Modern Literature course for those students who wanted more in this area. 1.5% of the Discussion group wanted fewer readings and more emphasis on how to understand and evaluate. A few suggested more "longer readings" but an almost equal number wanted fewer "longer readings."

Most of the free comments noted to this point have been those that tended to be negative or critical. There were also a number of favorable reactions. A proportionately greater number of these came from the Discussion group than from either of the other groups. Major reactions were that the course was "enjoyable" and that the respondents would continue reading on their own. This type of statement was made by 3.5% of the discussion students. 8% indicated that the course had increased their interest in literature while almost 3% said they would probably choose literature if they have more electives. 1% said that the course had helped them to increase their "depth of thinking." In the Lecture group, almost 3% noted their enjoyment of the course and most of these said they would probably do more reading on their own.

Two types of reactions were secured from the Modern Literature instructors. They were asked to indicate their preferences for the various possible methods of teaching Modern Literature, just as the students were, and those instructors who participated in more than one method were asked to make a direct comparison of the advantages and disadvantages of the methods.

The former question was sent to each of the 20 instructors of Modern Literature. Each of these instructors handled one or more sections of the course. Fifteen returned their questionnaires. Fourteen, or 70 per cent of the total sent, were usable. The fifteenth respondent said that he could not indicate a preference without knowing who the lecturer would be. Table XIV shows the percentages of the weighted choices of the instructors compared to the percentages for the total group of students.

Table XIV

Students	Faculty	
35.5%	47.7%	A. Informal discussion, with few or no formal lectures.
55.0	68.3	a. In sections of about thirty taught in a regular classroom.
11.0	2.4	b. In sections of about thirty taught by closed-circuit television and a sound system which enables students viewing television sets to enter the discussion.
34.0	29.3	c. In sections of about thirty meeting half the time in a regular classroom and half the time with the arrangement described under "b".
11.5%	2.3%	B. Lectures, with little or no discussion.
70.7	78.6	a. In a large classroom with the lecturer.
29.3	21.4	b. In classrooms by television.
53.0%	50.0%	C. Combination of lectures and discussion.
34.5	35.7	a. Lectures in a large classroom two days a week and discussions in sections of about twenty the other two days.
33.7	46.5	b. In sections of about thirty taught in a regular classroom for both lectures and discussions.
12.2	5.9	c. In a large classroom with lecturer two days a week, and the other two days in sections of about thirty taught by closed-circuit television and a sound system which enables students viewing television sets to enter the discussion.
19.6	11.9	d. In sections with about thirty meeting two days a week in a regular classroom for the discussion, the other two days viewing the lecturer on television.

It can be seen that the faculty tended to be more favorable toward the original method of teaching this course, than were the students. This showed up in the somewhat greater preference than the students had for the "Discussion only" method and less preference for the "Lecture only." As a matter of fact, the Lecture method was placed last by 13 of the 14 faculty members. Only one faculty member placed the Lecture method second and the Discussion method third. Even greater agreement among the faculty was found in the sub-choices. All were consistent in their preferences for methods which did not involve television. The one exception was in the event that the course was to be taught by the lecture method. In this case, three of the respondents indicated that they thought the course should then be taught by closed circuit television. Students were consistently more favorable toward the use of television than the faculty were. The differences, however, as shown in Table XIV, were not great.

There were four instructors who participated in both the Lecture and the Discussion methods. One of them had given some of the lectures and had led some of the discussion sections. The other three had simply led discussion sections for both the Lecture method and the Discussion method. The instructor who had done some of the lecturing believed that the Lecture-discussion method was more effective on the whole, resulting in superior grades and more active class participation. The three instructors who had not done any of the lecturing believed that the Lecture-discussion method was, in general, much inferior to the Discussion only method, resulting in less active class participation.

The lecturer's reasons for his views were as follows:

- 1) The discussion sections were smaller in the combination Lecture-discussion method.

- 2) The lecture provided a point of departure for discussion and minimized irrelevancies and false starts.

This instructor noted some of the disadvantages of the Lecture-discussion method, however, notably the fact that the lectures were necessarily somewhat impersonal and that some loose ends from the lectures were never pulled together.

The three instructors who had done none of the lectures were in agreement on one criticism of the Lecture-discussion method, that there was too great a time lapse between the lecture and the discussion, resulting in a lack of stimulation in terms of questions and general comment. Other criticisms of this method, each made by a single instructor, were:

- 1) The discussion leader had difficulty in grading and interpreting written assignments conceived by the lecturer.
- 2) Conflicting interpretations presented a problem.
- 3) There was not time for the adequate presentation of multiple interpretations and no extra time to devote to particularly difficult works, because of the rigid schedule.
- 4) The lecture tended to become a fact-dispensing period during which the students got "the answer," and average students trained under this method tend to be less capable of individual interpretation and analysis.
- 5) The system did not encourage a feeling of responsibility for his students on the part of the discussion leader.
- 6) There was considerable duplication of material in discussion and lecture.

Only one discussion leader made a favorable comment about the Lecture-discussion method. He noted that with a capable lecturer all sections benefit.

The instructors who did none of the lecturing also had some suggestions for the improvement of this method if it was continued.

- 1) Two instructors suggested that the class meet twice a week for two hours each time, rather than four times a week for one hour, and that the discussion period follow directly after the lecture.
- 2) Two also felt that more frequent meetings between discussion leaders and the lecturer be held to air interpretative differences.
- 3) One lecturer felt that the discussion leaders should make their own written assignments.
- 4) Another thought that mimeographed outlines should be issued a week in advance for each lecture.
- 5) One suggested that the same lecturer give both lectures and that he visit the various sections occasionally to insure co-ordination.

The instructor of the Television section and his two assistants submitted a single report. Their comments were as follows:

- 1) The technical aspects of the closed circuit class produced the least trouble.
- 2) Rapid, spontaneous verbal interchange between the panel and viewing rooms was impossible, and free discussion was thus impaired.

3) Close acquaintance with students was not possible.

Their conclusion was that "closed circuit television, in its present development, is an unsatisfactory medium for teaching a course which requires discussion. There are, however, several modified uses which might be worth attempting: (1) presentation of lectures twice a week via television, with the other two sections devoted to single-section discussion meetings; (2) presentation once a week, perhaps twice, of a panel, composed of instructor and selected students or of several instructors, with the other meetings devoted to small-group discussion. In either of these schemes presumably the lecturer or the discussants on the panel would not be open to questions from students in the viewing rooms."

Examination Results. A comparison of the final examination grades of a sample of students from each group was the third criterion in the evaluation of the three teaching methods. The examination papers of students in sections of instructors who taught more than one type of section were used for this purpose. This examination consisted of four multiple-part essay questions. Some of the papers were exchanged for grading between instructors in order to reduce the probability of individual bias. Each paper was given a letter grade which counted for one-fourth of the total course grade. The mean for each group and the number of cases upon which each mean was based are shown in Table XV. Letter grades of A, B, C, D, F were converted to number grades of 4, 3, 2, 1, 0, respectively, for the purpose of securing these means.

Table XV

	Lecture	Discussion	Television
n	92	106	63
Mean	2.25	2.14	2.00

The significance of these differences was tested with an analysis of variance. The summary table of the results is shown below.

Table XVI

Source of variation	Degrees of freedom	Sums of squares	Mean squares
Treatments	2	2.59	1.29
Within	258	203.28	.75
Total	260	205.87	

This resulted in an F of 1.72 which was not significant at the pre-set 5% level of confidence. With this many degrees of freedom, an F of 2.99 is needed for significance at the 5% level. Therefore, we cannot conclude that the three methods differentially affected student achievement as measured by the final examination of this course.

In evaluating the results of this study, a number of additional factors should be kept in mind.

Analysis of the student responses to many of the questions asked would seem to indicate that, in some of the discussion sections, most of the student participation took the form of asking questions, that the discussion was more the question and answer type rather than the problem-solving type.

On the days that the Television group was meeting via closed circuit television, less two-way communication took place between viewing rooms and the studio than occurred in any of the other courses which have been taught in this fashion, including a similar literature course which had been taught the previous year. One of the reasons for this was undoubtedly the adaptation that the instructor made to the medium. Toward the end of the semester he stated that he had a tendency to completely forget the students in the viewing rooms and simply to talk to and with those 8 or 10 students in the studio with him. This tendency was also noted by those who directed the televised portion of this class. Another possible reason was the attitude of one or both proctors. On at least one occasion, one of the proctors simply ignored the television instructor and delivered his own lecture to the students in that viewing room.

It is extremely difficult to show significant differences on test scores between various teaching methods unless the samples are extremely large or unless student ability is controlled. The variance caused by the differences in student ability is generally far greater than that caused by a possible difference in method.

In most cases, instructor differences are confounded with teaching methods differences. Only a small percentage of the twenty instructors who taught Modern Literature were involved in more than one method. It is, therefore, reasonable to assume that results are partly a factor of instructor differences. Assignment of instructors to sections was random with the exception of the two lecturers and the leader of the Television group. These were all senior members of the staff with long teaching experience.

Conclusions

The results of this study present no evidence to justify the use of closed circuit television for discussion as it was used in the Modern Literature course. Any possible advantages appeared to be outweighed by the disadvantages found. It is felt, however, that experimentation which uses television in a somewhat different way might prove fruitful. Evidence was found to justify the continuation of the combination Lecture-discussion method tried in this study. There was a certain amount of faculty time saved and results as measured by the final examination were comparable with those from the conventional method of teaching the course. On the other hand, the high degree of approval expressed by both students and teachers for the discussion method, either with or without accompanying lectures, seems to indicate a conviction that the discussions offer educational values not obtainable by mass methods of instruction. The current plan at the State University of Iowa is to continue experimentation with the lecture-discussion method in some Literature courses next year, incorporating possible improvements based on this year's experience.